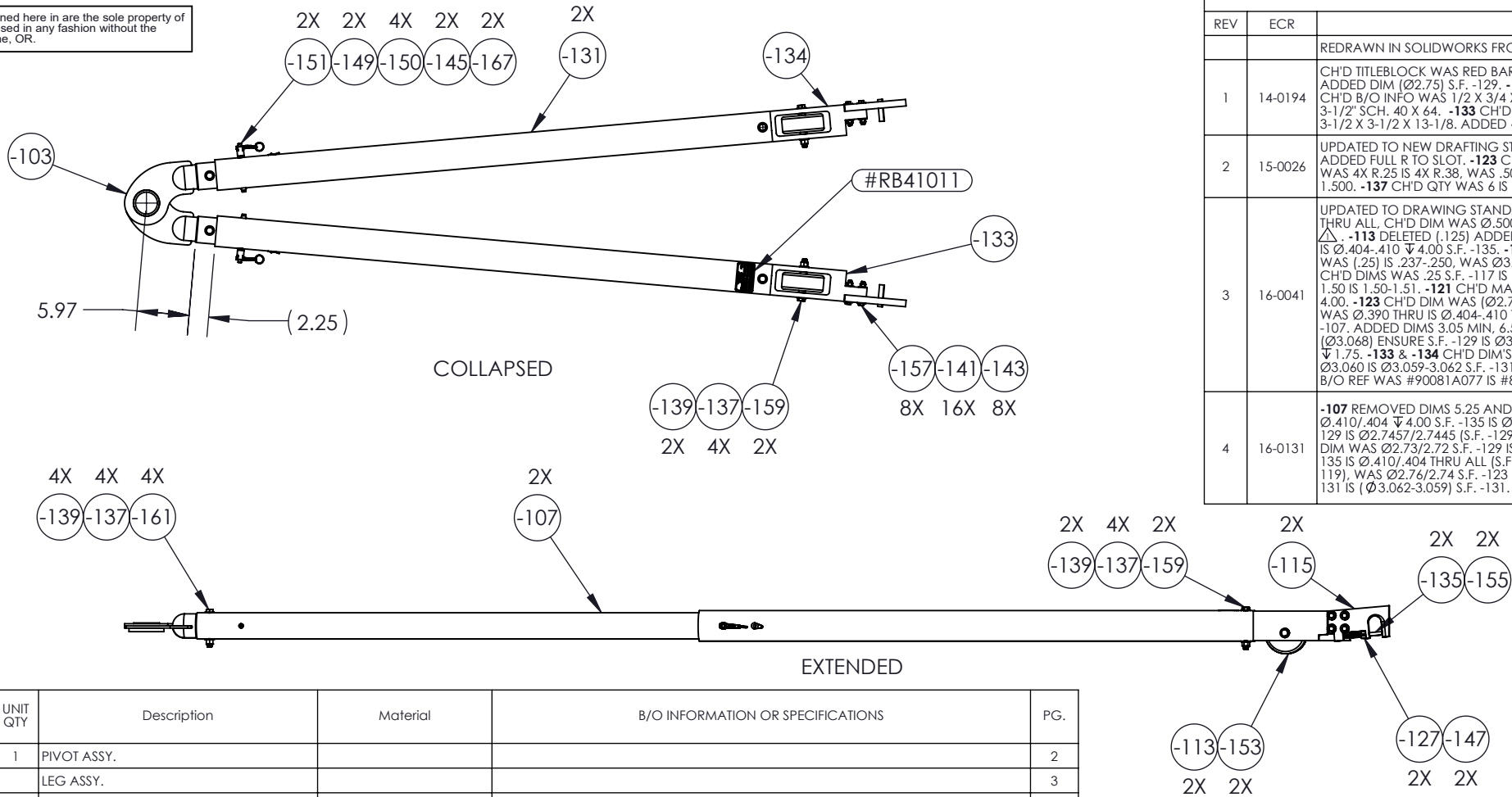


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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
		REDRAWN IN SOLIDWORKS FROM TATTERED ORIGINAL DWG.	2/21/2014	JAG	RW
1	14-0194	CH'D TITLEBLOCK WAS RED BARN IS DART. -113 ADDED DWG. -115 CH'D DIM WAS .75 IS (.75). -119 ADDED DIM (Ø2.75) S.F. -129. -121 CH'D DIMS WAS Ø4.00 IS (Ø4.00). -127 CH'D DIM WAS .50 IS (.50). CH'D B/O INFO WAS 1/2 X 3/4 X 2-5/8 IS 1/2 X 1 X 2-5/8. -131 CH'D B/O INFO WAS 3" SCH. 40 X 64 IS 3-1/2" SCH. 40 X 64. -133 CH'D DIM WAS 3.50 IS (3.50). CH'D B/O INFO WAS 3-1/2 X 3-5/8 X 13-1/8 IS 3-1/2 X 3-1/2 X 13-1/8. ADDED -134. -135 CH'D DIM WAS Ø.380 IS (Ø.380).	10/20/2014	DPD	JAG
2	15-0026	UPDATED TO NEW DRAFTING STANDARDS. -103 ADDED SHIM NOTE. -119 CH'D DIM WAS 3.50 IS 3.38. ADDED FULL R TO SLOT. -123 CH'D DIM WAS Ø2.738 IS (Ø2.738) S.F. -129. -133 & -134 CH'D DIMS WAS 4X R.25 IS 4X R.38. WAS .50 IS 2X .50. WAS 1.500 IS 2X 1.500. WAS .50 IS 2X .50. WAS 1.500 IS 2X 1.500. -137 CH'D QTY WAS 6 IS 12. -141 CH'D QTY WAS 8 IS 16.	1/30/2015	DPD	JAG
3	16-0041	UPDATED TO DRAWING STANDARDS. -107 ADDED DIMENSIONS 5.25, 1.49-1.50, Ø.515 +.010-.000 THRU ALL. CH'D DIM WAS Ø.500 +.030-.000 THRU ALL IS 2X Ø.500 +.030-.000 THRU ALL. ADDED NOTE Δ. -113 DELETED (.125) ADDED (.50) DIMS. -115 CH'D DIMS WAS (.75) IS .75. WAS Ø.404-.410 ∇ 4.00 IS Ø.404-.410 ∇ 4.00 S.F. -135. -117 CH'D MATERIAL WAS HR P&O IS A36/1018/1020 HR. CH'D DIMS WAS (.25) IS .237-.250. WAS Ø3.00 IS Ø2.99-3.01. -119 CH'D CALLOUT WAS FULL R IS FULL R OPTIONAL. CH'D DIMS WAS .25 S.F. -117 IS .2572-.2550. WAS (Ø2.75) S.F. -129 IS Ø2.7457-2.7445 S.F. -129. WAS 1.50 IS 1.50-1.51. -121 CH'D MATL WAS ASTM A513 IS A36/1018/1020 HR. CH'D DIM WAS (Ø4.00) IS 4.00. -123 CH'D DIM WAS (Ø2.738) S.F. -129 IS Ø2.72-2.73 S.F. -129. -127 CH'D DIM WAS (.50) IS .50. WAS Ø.390 THRU IS Ø.404-.410 THRU ALL S.F. -135. -129 DELETED Ø.500 AND Ø.515 HOLES. MOVED TO -107. ADDED DIMS 3.05 MIN. 6.55 MIN. Ø2.75-2.76 S.F. -119. Ø2.74-2.76 S.F. -123. -131 CH'D DIMS WAS (Ø3.068) ENSURE S.F. -129 IS Ø3.122-3.068 S.F. -129 & -133. WAS Ø.092-.096 ∇ .22 IS Ø.142-.146 ∇ 1.75. -133 & -134 CH'D DIMS WAS 2.38 IS 2.39 +03-.00. WAS 1.19 IS 1.20. WAS (3.50) IS 3.50. WAS Ø3.060 IS Ø3.059-3.062 S.F. -131. -135 CH'D DIM WAS (Ø.380) IS Ø.37-.40 S.F. -115 & -127. -145 CH'D B/O REF WAS #90081A077 IS #8 X 1/4 #90081A190. CH'D QTY WAS 6 IS 2. -167 ADDED TO BOM.	2/18/2016	RJC	JAG
4	16-0131	-107 REMOVED DIMS 5.25 AND 1.50-149. ADDED DIMS 55.50 AND 62.25. -115 CH'D DIM WAS Ø.410/.404 ∇ 4.00 S.F. -135 IS Ø.410/.404 ∇ 4.00 (S.F. -135). -119 CH'D DIM WAS Ø2.7457/2.7445 S.F. -129 IS Ø2.7457/2.7445 (S.F. -129). -121 CH'D DIM WAS Ø2.960 S.F. -105 IS Ø2.960 (S.F. -105). -123 CH'D DIM WAS Ø2.73/2.72 S.F. -129 IS Ø2.73/2.72 (S.F. -129). -127 CH'D DIM WAS Ø.410/.404 THRU ALL S.F. -135 IS Ø.410/.404 THRU ALL (S.F. -135). -129 CH'D DIM WAS Ø2.76/2.75 S.F. -119 IS Ø2.76/2.75 (S.F. -119). WAS Ø2.76/2.74 S.F. -123 IS Ø2.76/2.74 (S.F. -123). -133 -134 CH'D DIM WAS Ø3.062-3.059 S.F. -131 IS (Ø3.062-3.059) S.F. -131.	8/29/2016	DEW	SM

ASSY QTY	ASSY QTY	ASSY QTY	B/O	Part #	UNIT QTY	Description	Material	B/O INFORMATION OR SPECIFICATIONS	PG.
		X		-103	1	PIVOT ASSY.			2
	X	2		-105		LEG ASSY.			3
X				-107	2	TUBE ASSY.			4
				-113	2	WHEEL BUSHING	STEEL	(INCLUDED WITH -153) MODIFIED	5
				-115	2	HOOK	304 S.S.		6
	1			-117		PLATE	A36/1018/1020 HR		7
	1			-119		LEG TUBE	STEEL	(KOCH METAL SPINNING OR AIRCRAFT HARDWARE, NO HOLES PREFERRED) MODIFIED	8
		1		-121		COLLAR	A36/1018/1020 HR		9
1				-123		PLUG	6061		10
				-127	2	HANDLE	304 S.S.		11
1				-129		INNER TUBE	6061		12
				-131	2	OUTER TUBE	6061		13
				-133	1	WHEEL BLOCK	6061		14
				-134	1	WHEEL BLOCK	6061		15
				-135	2	PIN	303 S.S.		16
			B/O	-137	12	WASHER	STEEL	Ø 1/2 (MCMASTER-CARR #90126A033)	1
			B/O	-139	6	NYLON-INSERT LOCKNUT	STEEL	1/2-20, GRADE 5 (MCMASTER-CARR #95615A220)	1
			B/O	-141	16	WASHER	STEEL	3/8 (MCMASTER-CARR #90108A417)	1
			B/O	-143	8	NYLON-INSERT LOCKNUT	STEEL	3/8-24, GRADE 5 (MCMASTER-CARR #95615A150)	1
			B/O	-145	2	DRIVE SCREW	COATED STEEL	#8 X 1/4 (MCMASTER-CARR #90081A190)	1
			B/O	-147	2	SET SCREW	S.S.	1/4-28 X 3/8 (MCMASTER-CARR #92311A558)	1
			B/O	-149	2	LANYARD	COATED STEEL	Ø1/16 X 8 (CARR LANE #CL-2-C)	NS
			B/O	-150	4	FERRULE	ALUMINUM	Ø1/16 X 3/8 (MCMASTER-CARR #3896T31)	NS
			B/O	-151	2	BALL LOCK PIN	STEEL	(CARR-LANE #CL-8-BLPL-3.5)	1
			B/O	-153	2	CASTER		(GALIFICO #WR9205)	1
			B/O	-155	2	SPRING	S.S.	(LEE SPRING #LC-042G-12-S316)	1
			B/O	-157	8	BOLT	STEEL	3/8-24 X 2-1/2, GRADE 5 (MCMASTER-CARR #91247A227)	1
			B/O	-159	4	BOLT	STEEL	1/2-20 X 4-1/2, GRADE 5 (MCMASTER-CARR #91247A366)	1
			B/O	-161	2	BOLT	STEEL	1/2-20 X 4, GRADE 5 (MCMASTER-CARR #91247A364)	1
			B/O	-165	1	SHIPPING CRATE		(SPECIALTY CRATE "TOW BAR CRATE" (92x14x6.5))	NS
			B/O	-167	2	LANYARD TAB	ALUMINUM	#10 (CARR-LANE #CL-.194-TAB-A)	1
			B/O		1	DART PLACARD	ALUMINUM	#RB41011	1
ASSY -107	ASSY -105	ASSY -103							

SEE ATTACHED DEVIATION

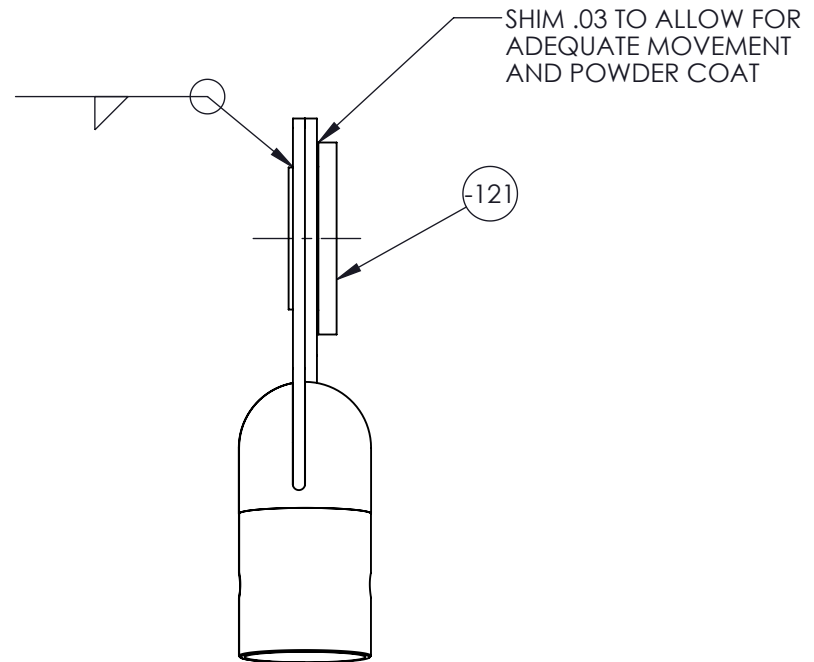
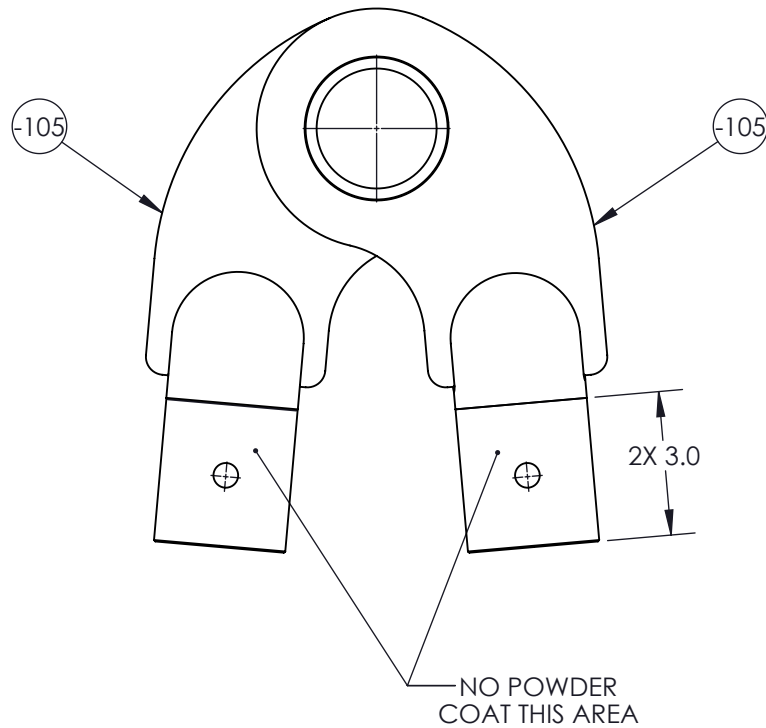
- NOTES:
1. REF: BELL T/N: T101808
 2. COMMERCIALLY AVAILABLE EQUIVALENT MATERIAL MAY BE SUBSTITUTED FOR EASE OF MANUFACTURING.

DART AEROSPACE			
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.			
DWG NO. RB T101808-101			REV 4
MAT'L HEAT TREAT FINISH SPEC		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS ± 1/8 .XXX ± .005 .XX ± .01 .X ± .1 ANGLES ±.5° SURFACES = 125/✓	
DRAWN BY: CLOUGH		1. BREAK ALL SHARP EDGES .015 x 45° OR .015R	
CHECKED: DUERFELDT		2. DIMENSIONAL LIMITS APPLY AFTER PLATING	
OPPS APPR: ANDERSON		3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009	
QA APPR: LINDSAY		USED ON MODEL	
APPROVED: GILBERT		BELL	
SCALE 1:18		DATE 2/18/2014	SHEET 1 OF 16

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
2	15-0026	-103 ADDED SHIM NOTE.	1/30/2015	DPD	SM

SEE ATTACHED DEVIATION



-103

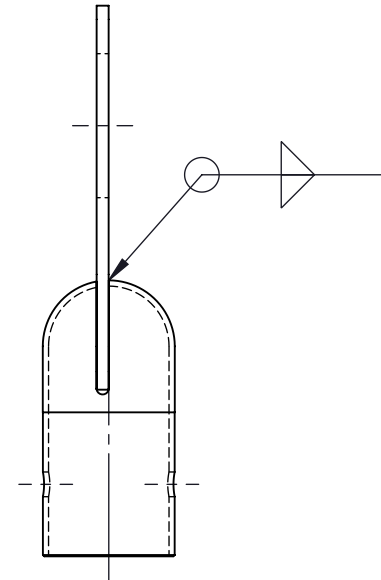
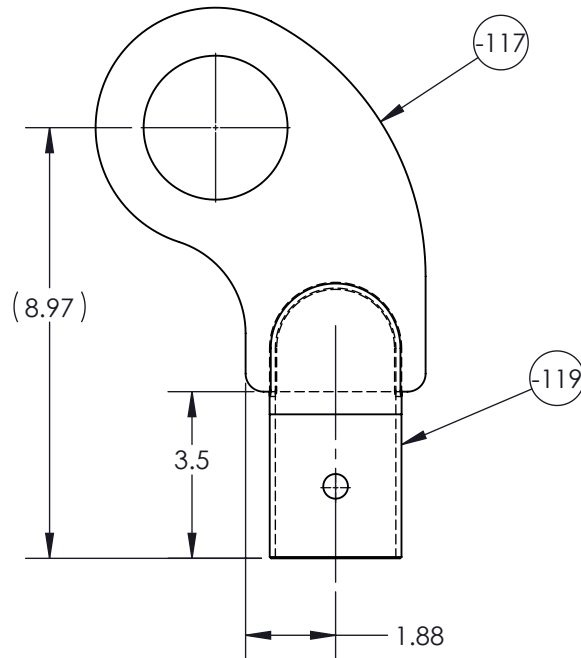
PIVOT ASSY

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY	
DWG NO. RB T101808-103	REV 4
MAT'L HEAT TREAT FINISH POWDER COAT YELLOW SPEC FED #13538	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES .XXX ± .010 FRACTIONS ± 1/8 .XX ± .03 ANGLES ± 1° .X ± .1 SURFACES = 125°
DRAWN BY: GILBERT	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:4	DATE 2/19/2014
SHEET 2 OF 16	

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REVISIONS				
REV	ECR	DESCRIPTION	DATE	INITIAL
				APPROVED

SEE ATTACHED DEVIATION



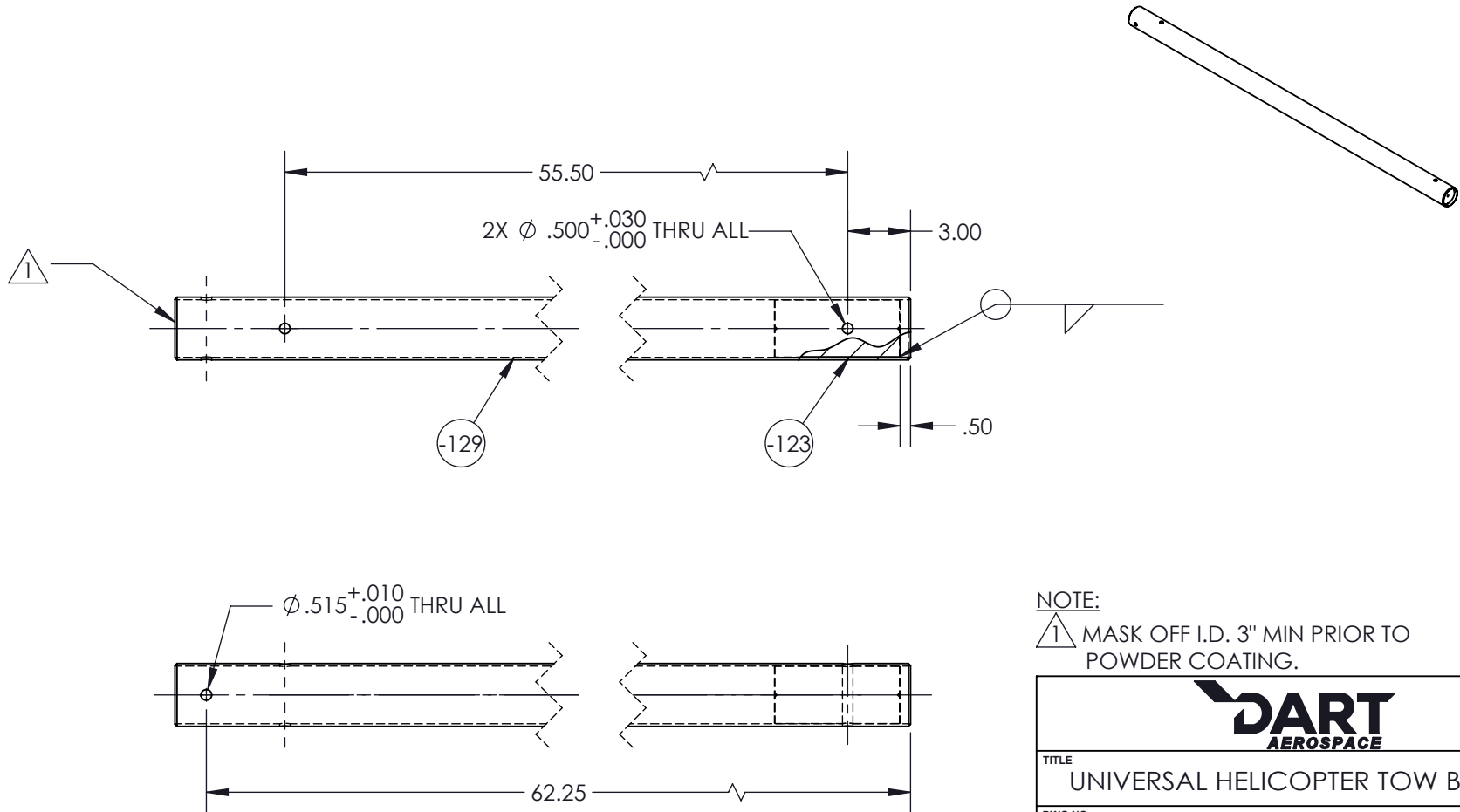
(-105)
LEG ASSY

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-105	REV 4
MAT'L HEAT TREAT FINISH SEE -103	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES .XXX ± .010 FRACTIONS ± 1/8 .XX ± .03 ANGLES ± 1° .X ± .1 SURFACES = 125°
SPEC	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
DRAWN BY: GILBERT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
CHECKED: DUERFELDT	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
OPPS APPR: ANDERSON	USED ON MODEL
QA APPR: LINDSAY	BELL
APPROVED: GILBERT	
SCALE 1:4	DATE 2/18/2014
SHEET 3 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
3	16-0041	-107 ADDED DIMENSIONS 5.25, 1.49-1.50, Ø.515 +.010-.000 THRU ALL, CH'D DIM WAS Ø.500 +.030-.000 THRU ALL IS 2X Ø.500 +.030-.000 THRU ALL. ADDED NOTE 1.	2/18/2016	RJC	JAG
4	16-0131	-107 REMOVED DIMS 5.25 AND 1.50-1.49, ADDED DIMS 55.50 AND 62.25.	8/29/2016	DEW	SM

SEE ATTACHED DEVIATION



NOTE:

1 MASK OFF I.D. 3" MIN PRIOR TO POWDER COATING.

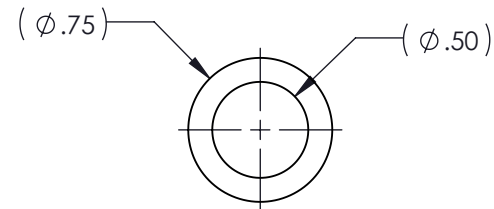
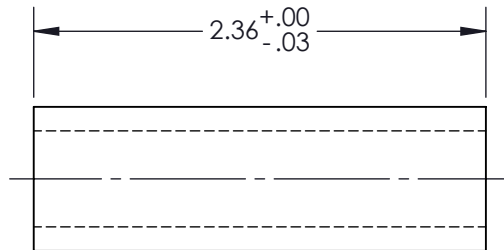
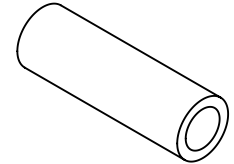
(-107)
TUBE ASSY.

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-107	REV 4
MAT'L HEAT TREAT FINISH POWDER COAT YELLOW SPEC FED #13538	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES .XXX ± .010 FRACTIONS ± 1/8 .XX ± .03 ANGLES ± 1° .X ± .1 SURFACES = 125°
DRAWN BY: CLOUGH	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:8	DATE 2/18/2014
SHEET 4 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
3	16-0041	-113 DELETED (.125) ADDED (.50) DIMS.	2/18/2016	RJC	JAG

SEE ATTACHED DEVIATION

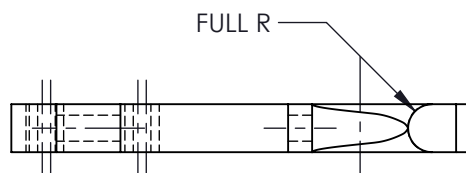
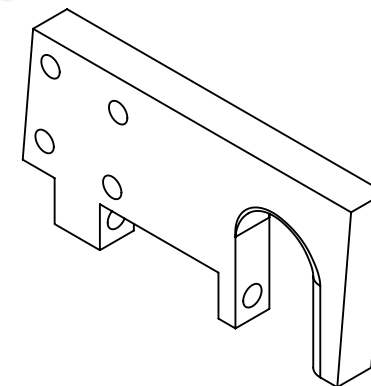
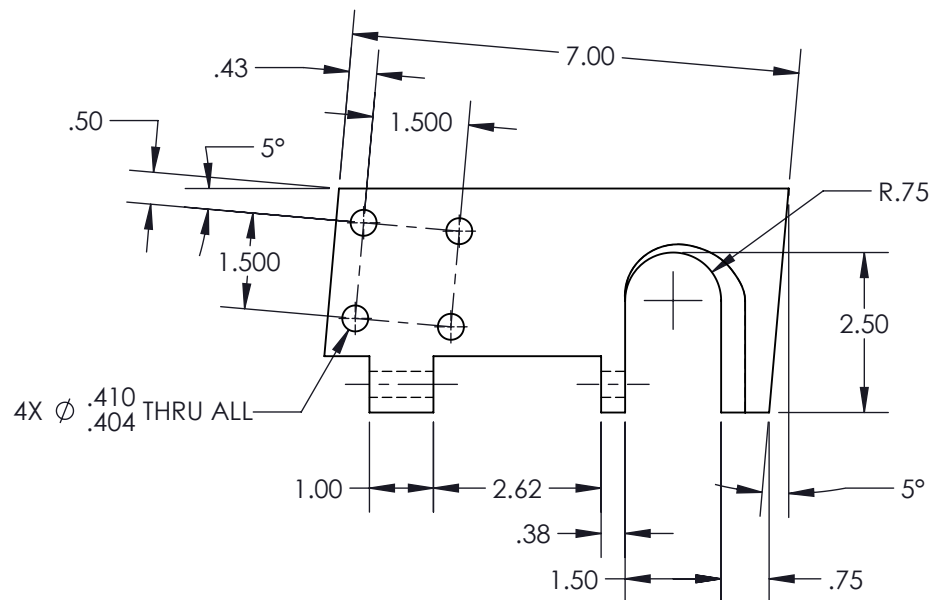


(-113)

WHEEL BUSHING

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-113	REV 4
MAT'L STEEL	UNLESS OTHERWISE SPECIFIED
HEAT TREAT	DIMENSIONS ARE IN INCHES
FINISH	.XXX ± .010 FRACTIONS ± 1/8
SPEC	.XX ± .03 ANGLES ± 1°
	.X ± .1 SURFACES = 125°
DRAWN BY: DUERFELDT	1. BREAK ALL SHARP EDGES
CHECKED: DUERFELDT	.015 x 45° OR .015R
OPPS APPR: ANDERSON	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
QA APPR: LINDSAY	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
APPROVED: GILBERT	USED ON MODEL
SCALE 1:1	BELL
DATE 10/20/2014	SHEET 5 OF 16

REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
1	14-0194	-115 CH'D DIM WAS .75 IS (.75).	10/20/2014	DPD	JAG
3	16-0041	-115 CH'D DIMS WAS (.75) IS .75, WAS Ø.404-.410 ∇ 4.00 IS Ø.404-.410 ∇ 4.00 S.F. -135.	2/18/2016	RJC	JAG
4	16-0131	-115 CH'D DIM WAS Ø.410/.404 ∇ 4.00 S.F. -135 IS Ø.410/.404 ∇ 4.00 (S.F. -135).	8/29/2016	DEW	SM



(-115)

HOOK



TITLE	UNIVERSAL HELICOPTER TOW BAR ASSY.
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DWG NO.	RB T101808-115	REV 4
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MAT'L 304 S.S.	UNLESS OTHERWISE SPECIFIED	
HEAT	DIMENSIONS ARE IN INCHES	
TREAT	.XXX ± .010	FRACTIONS ± 1/8
FINISH	XX ± .03	ANGLES ±1°

SPEC		.X ± .1 SURFACES = 125/√ 1. BREAK ALL SHARP EDGES .015 x 45° OR .015R 2. DIMENSIONAL LIMITS APPLY AFTER PLATING 3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
DRAWN BY:	CLOUGH	
CHECKED:	DUERFELDT	
OPPS APPR:	ANDERSON	

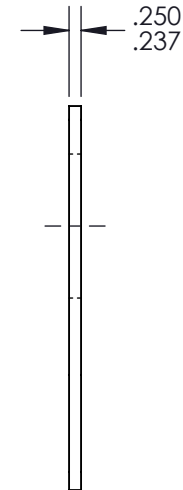
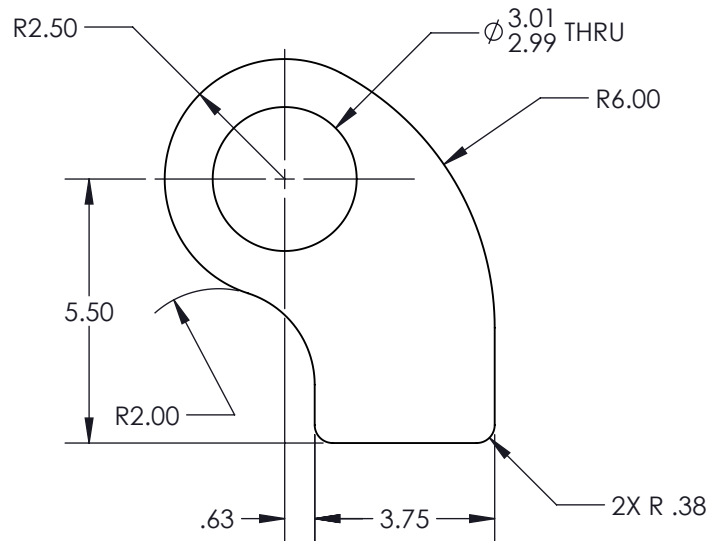
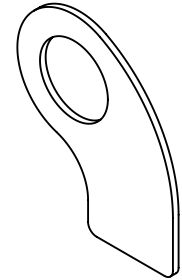
QA APPR:	LINDSAY	USED ON MODEL
APPROVED:	GILBERT	BELL

SCALE	1:3	DATE	2/18/2014	SHEET 6 OF 16
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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
3	16-0041	-117 CH'D MATERIAL WAS HR P&O IS A36/1018/1020 HR. CH'D DIMS WAS (.25) IS .237-.250, WAS Ø3.00 IS Ø2.99-3.01.	2/18/2016	RJC	JAG

SEE ATTACHED DEVIATION



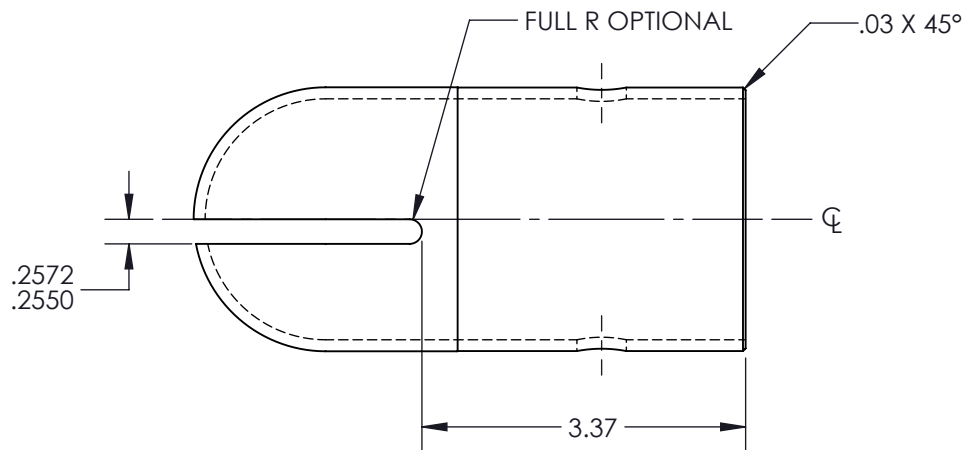
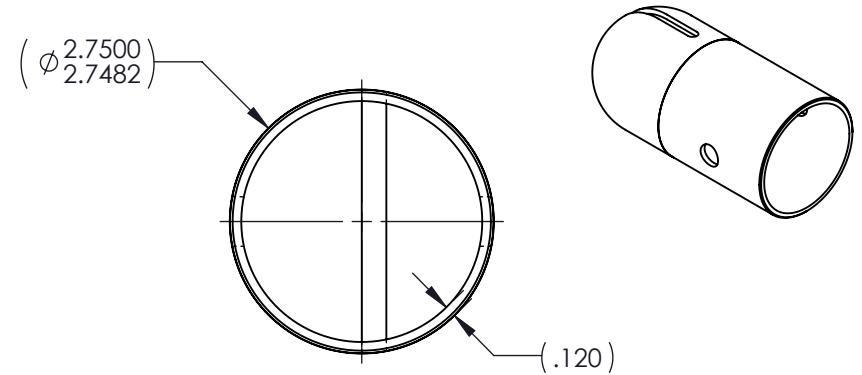
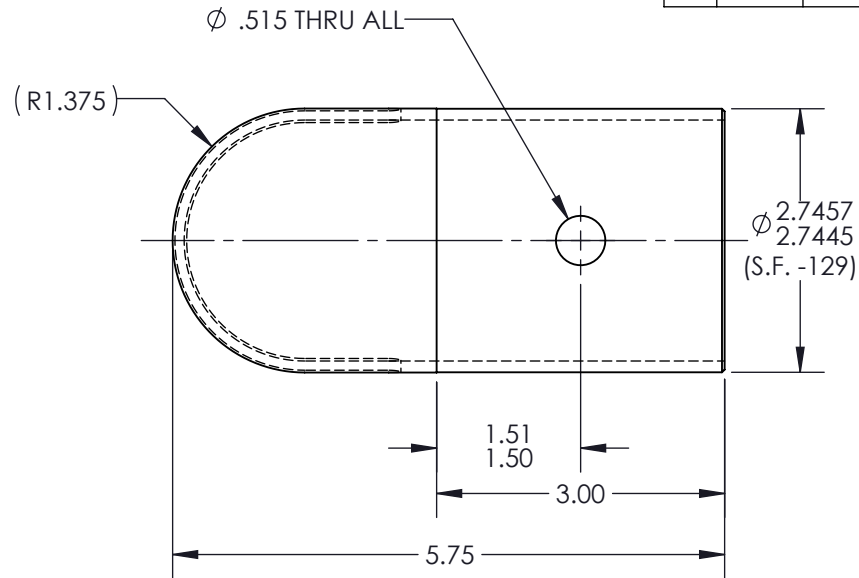
(-117)

PLATE

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-117	REV 4
MAT'L A36/1018/1020 HR	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH SEE -105	.XX ± .03 ANGLES ± 1°
SPEC	.X ± .1 SURFACES = 125° ✓
DRAWN BY: GILBERT	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:4	DATE 2/18/2014
SHEET 7 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
1	14-0194	-119 ADDED DIM (Ø2.75) S.F. -129.	10/20/2014		
2	15-0026	-119 CH'D DIM WAS 3.50 IS 3.38. ADDED FULL R TO SLOT.	1/30/2015	DPD	JAG
3	16-0041	-119 CH'D CALLOUT WAS FULL R IS FULL R OPTIONAL. CH'D DIMS WAS .25 S.F. -117 IS .2572-.2550, WAS (Ø2.75) S.F. -129 IS Ø2.7457 -2.7445 S.F. -129, WAS 1.50 IS 1.50-1.51.	2/18/2016	RJC	JAG
4	16-0131	-119 CH'D DIM WAS Ø2.7457/2.7445 S.F. -129 IS Ø2.7457/2.7445 (S.F. -129).	8/29/2016	DEW	SM



-119

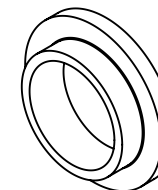
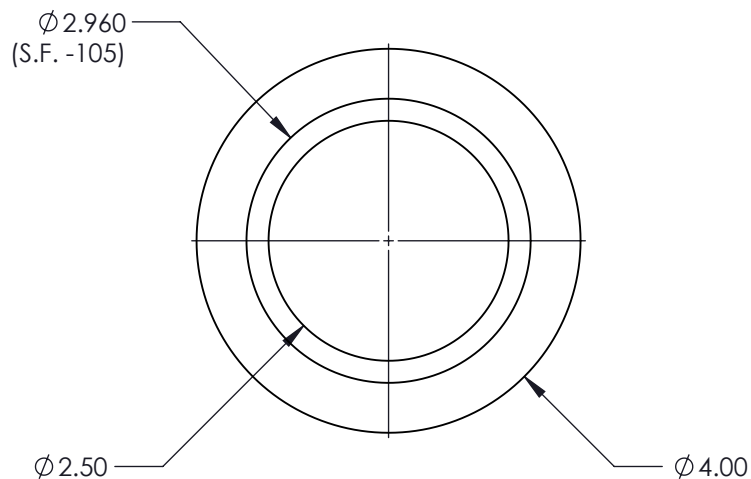
LEG TUBE

SEE ATTACHED DEVIATION

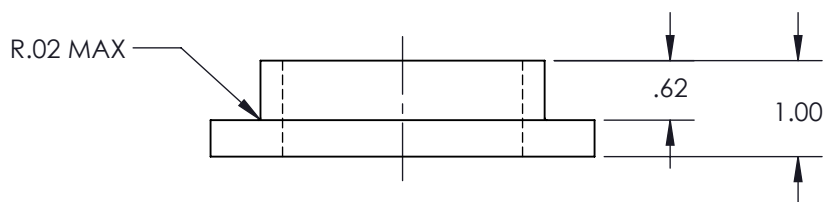
DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-119	REV 4
MAT'L STEEL	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH SEE -105	.XX ± .03 ANGLES ± 1°
SPEC	.X ± .1 SURFACES = 125° ✓
DRAWN BY: GILBERT	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:2	DATE 2/18/2014
SHEET 8 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
1	14-0194	-121 CH'D DIMS WAS Ø4.00 IS (Ø4.00).	10/20/2014	DPD	JAG
3	16-0041	-121 CH'D MAT'L WAS ASTM A513 IS A36/1018/1020 HR. CH'D DIM WAS (Ø4.00) IS 4.00.	2/18/2016	RJC	JAG
4	16-0131	-121 CH'D DIM WAS Ø2.960 S.F. -105 IS Ø2.960 (S.F. -105).	8/29/2016	DEW	SM



SEE ATTACHED DEVIATION



(-121)

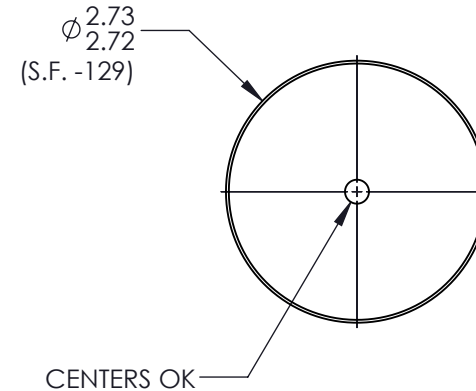
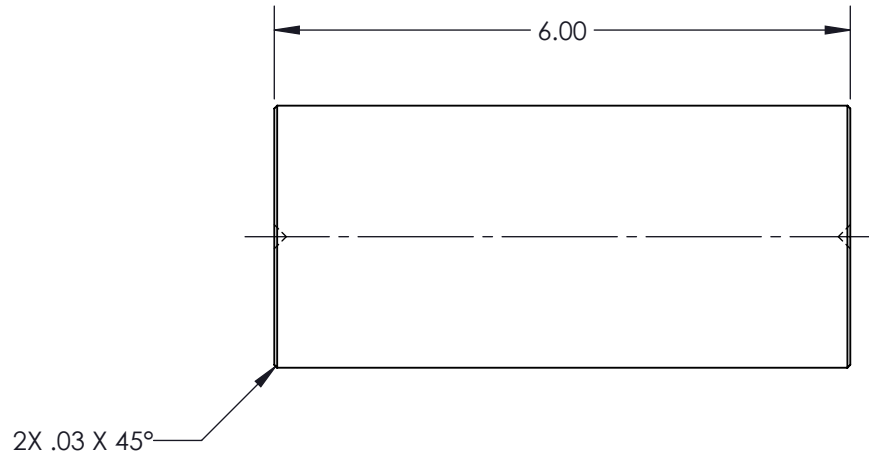
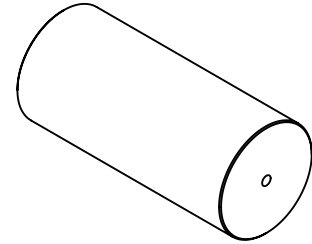
COLLAR

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-121	REV 4
MAT'L A36/1018/1020 HR	UNLESS OTHERWISE SPECIFIED
HEAT TREAT	DIMENSIONS ARE IN INCHES
FINISH SEE -103	.XXX ± .010 FRACTIONS ± 1/8
SPEC	.XX ± .03 ANGLES ± 1°
	.X ± .1 SURFACES = 125
DRAWN BY: CLOUGH	1. BREAK ALL SHARP EDGES
CHECKED: DUERFELDT	.015 x 45° OR .015R
OPPS APPR: ANDERSON	2. DIMENSIONAL LIMITS APPLY
QA APPR: LINDSAY	AFTER PLATING
APPROVED: GILBERT	3. INTERPRET DIM AND TOL PER
	ASME Y14.5M-2009
SCALE 1:2	DATE 2/18/2014
	SHEET 9 OF 16

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
2	15-0026	-123 CH'D DIM WAS Ø2.738 IS (Ø2.738) S.F. -129.	1/30/2015	DPD	JAG
3	16-0041	-123 CH'D DIM WAS (Ø2.738) S.F. -129 IS Ø2.72-2.73 S.F. -129.	2/18/2016	RJC	JAG
4	16-0131	-123 CH'D DIM WAS Ø2.73/2.72 S.F. -129 IS Ø2.73/2.72 (S.F. -129).	8/29/2016	DEW	SM

SEE ATTACHED DEVIATION



(-123)

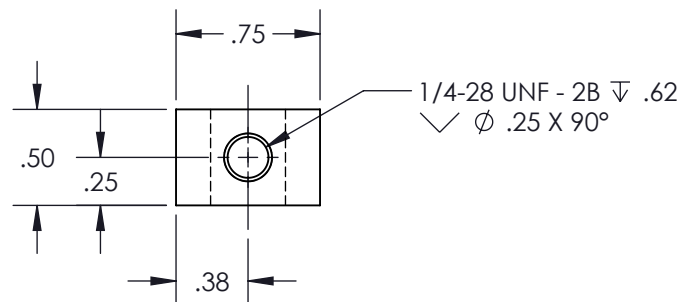
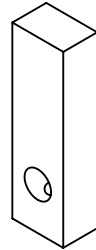
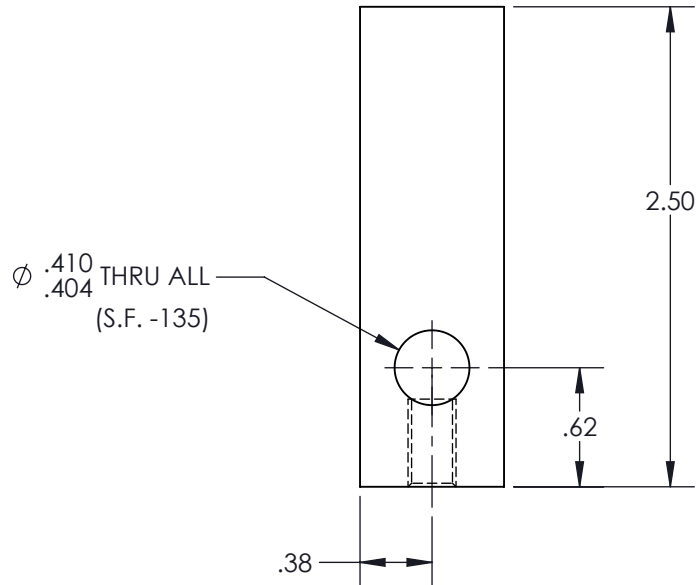
PLUG

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-123	REV 4
MAT'L 6061	UNLESS OTHERWISE SPECIFIED
HEAT TREAT	DIMENSIONS ARE IN INCHES
FINISH SEE -107	.XXX ± .010 FRACTIONS ± 1/8
SPEC	.XX ± .03 ANGLES ± 1°
	.X ± .1 SURFACES = 125
DRAWN BY: GILBERT	1. BREAK ALL SHARP EDGES
CHECKED: DUERFELDT	.015 x 45° OR .015R
OPPS APPR: ANDERSON	2. DIMENSIONAL LIMITS APPLY
QA APPR: LINDSAY	AFTER PLATING
APPROVED: GILBERT	3. INTERPRET DIM AND TOL PER
	ASME Y14.5M-2009
	USED ON MODEL
	BELL
SCALE 1:2	DATE 2/18/2014
	SHEET 10 OF 16

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
1	14-0194	-127 CH'D DIM WAS .50 IS (.50).	10/20/2014	DPD	JAG
3	16-0041	-127 CH'D DIM WAS (.50) IS .50, WAS Ø.390 THRU IS Ø.404-.410 THRU ALL S.F. -135.	2/18/2016	RJC	JAG
4	16-0131	-127 CH'D DIM WAS Ø.410/.404 THRU ALL S.F. -135 IS Ø.410/.404 THRU ALL (S.F. -135).	8/29/2016	DEW	SM

SEE ATTACHED DEVIATION



-127

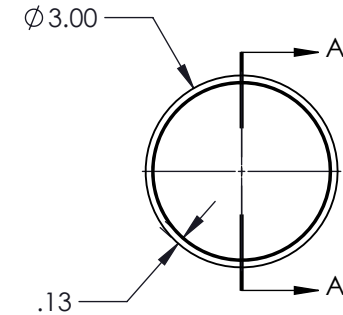
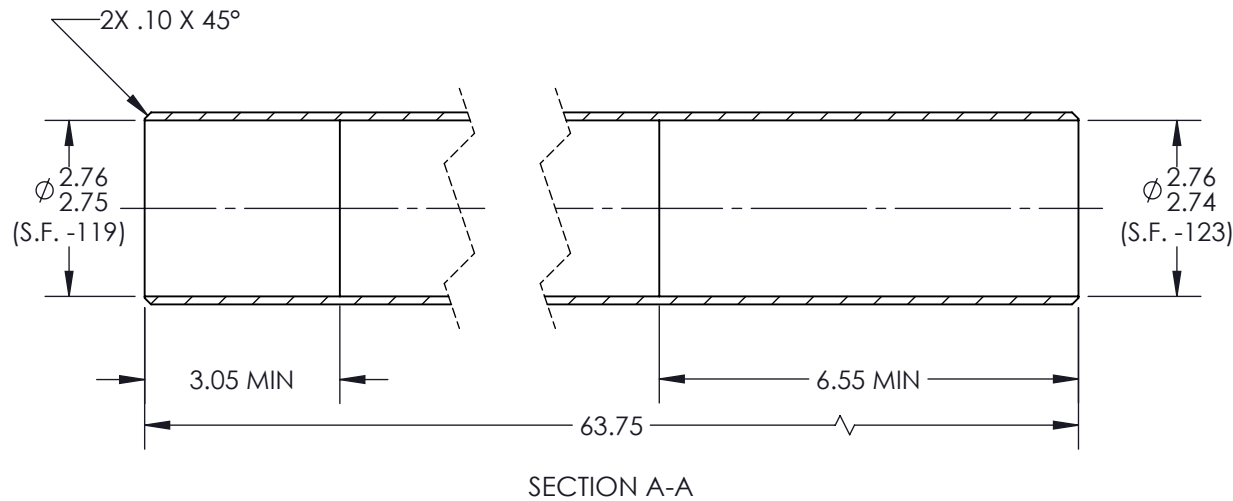
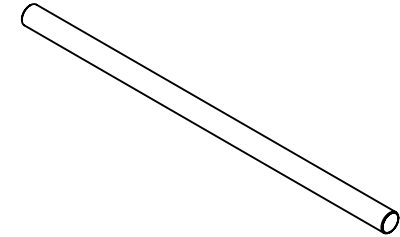
HANDLE

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-127	REV 4
MAT'L 304 S.S.	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT FINISH	.XXX ± .010 FRACTIONS ± 1/8
SPEC	.XX ± .03 ANGLES ± 1°
	.X ± .1 SURFACES = 125° ✓
DRAWN BY: CLOUGH	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:1	DATE 2/18/2014
SHEET 11 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
3	16-0041	-129 DELETED Ø.500 AND Ø.515 HOLES, MOVED TO -107. ADDED DIMS 3.05 MIN, 6.55 MIN, Ø2.75-2.76 S.F. -119, Ø2.74-2.76 S.F. -123.	2/18/2016	RJC	JAG
4	16-0131	-129 CH'D DIM WAS Ø2.76/2.75 S.F. -119 IS Ø2.76/2.75 (S.F. -119), WAS Ø2.76/2.74 S.F. -123 IS Ø2.76/2.74 (S.F. -123).	8/29/2016	DEW	SM

SEE ATTACHED DEVIATION



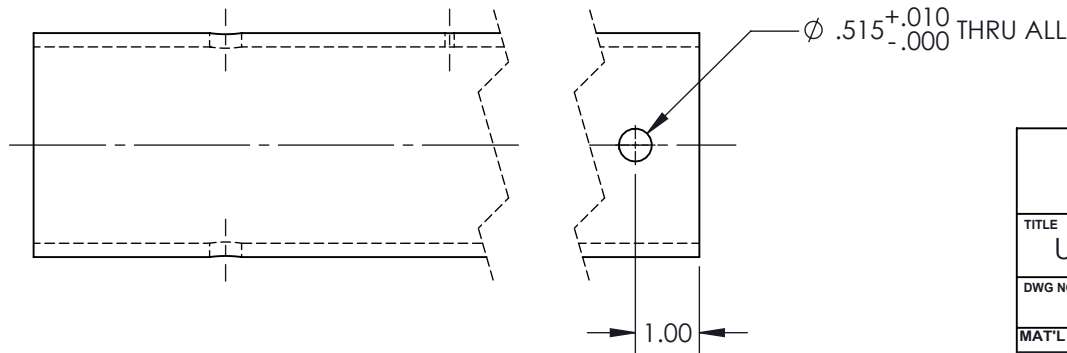
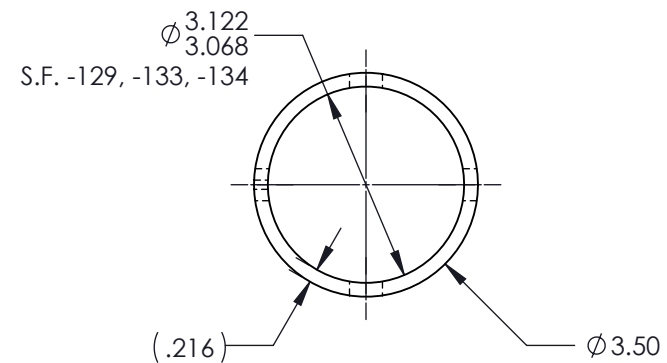
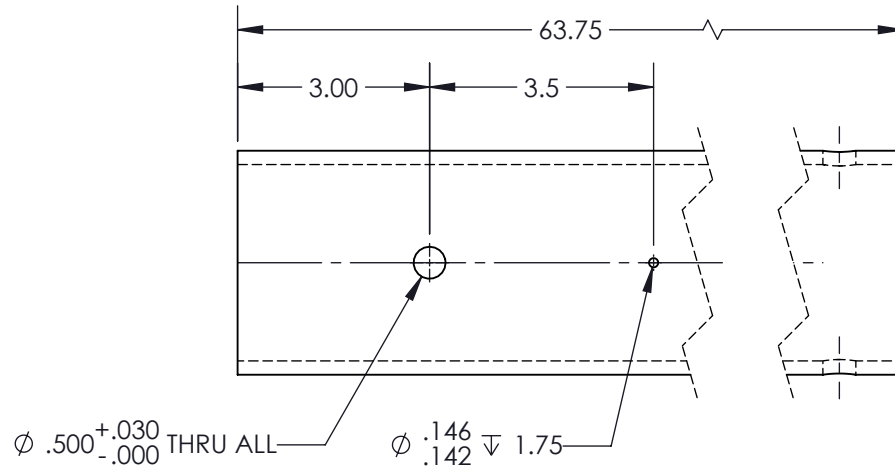
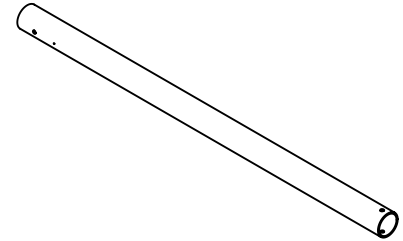
(-129)
INNER TUBE

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-129	REV 4
MAT'L 6061	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH SEE -107	.XX ± .03 ANGLES ± 1°
SPEC	.X ± .1 SURFACES = 125° ✓
DRAWN BY: GILBERT	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:3	DATE 2/18/2014
SHEET 12 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
3	16-0041	-131 CH'D DIMS WAS (Ø3.068) ENSURE S.F. -129 IS Ø3.122 -3.068 S.F. -129 & -133, WAS Ø.092-.096 ↓.22 IS Ø.142-.146 ↓ 1.75.	2/18/2016	RJC	JAG

SEE ATTACHED DEVIATION



(-131)

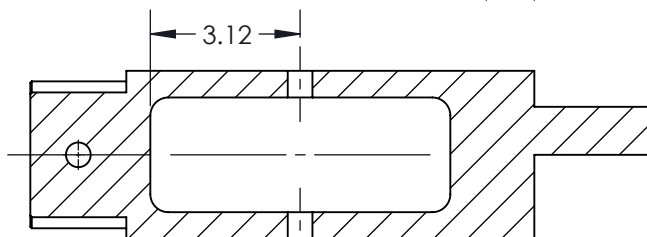
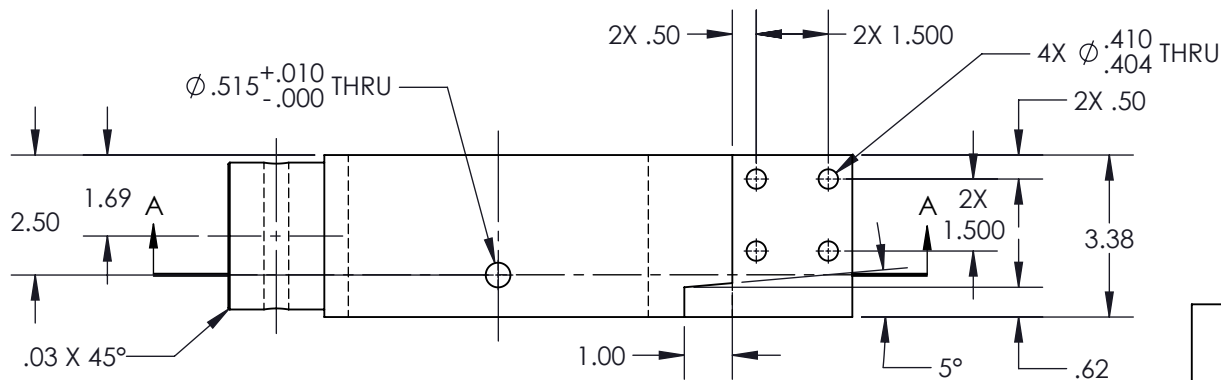
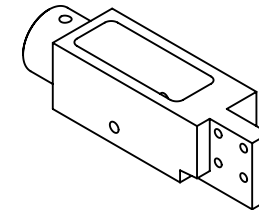
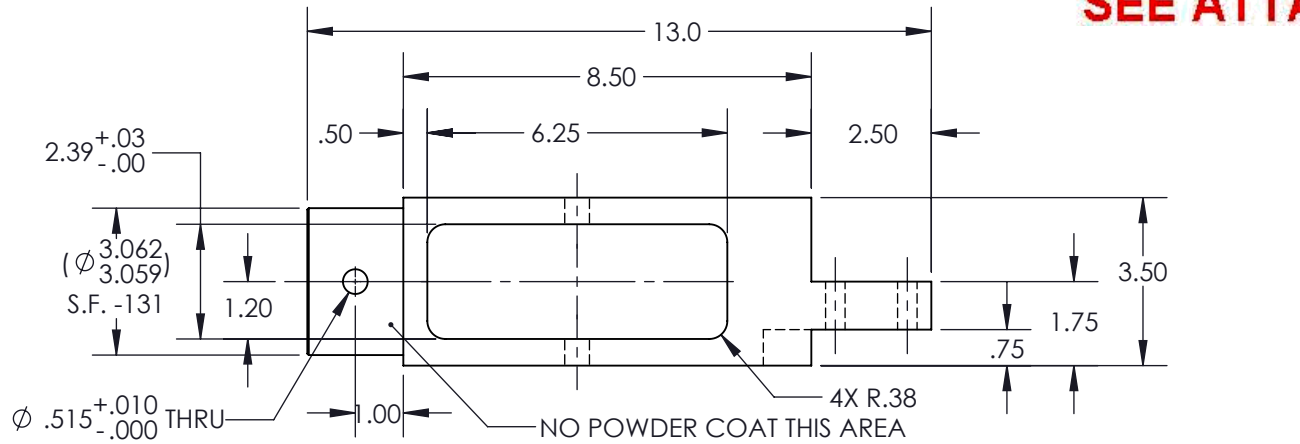
OUTER TUBE

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-131	REV 4
MAT'L 6061	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH POWDER COAT YELLOW	.XX ± .03 ANGLES ± 1°
SPEC FED #13538	.X ± .1 SURFACES = 125 ✓
DRAWN BY: GILBERT	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:3	DATE 2/18/2014
SHEET 13 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
1	14-0194	-133 CH'D DIM WAS 3.50 IS (3.50).	10/20/2014	DPD	JAG
2	15-0026	-133 CH'D DIMS WAS 4X R.25 IS 4X R.38, WAS .50 IS 2X .50, WAS 1.500 IS 2X 1.500, WAS .50 IS 2X .50, WAS 1.500 IS 2X 1.500.	1/30/2015	DPD	JAG
3	16-0041	-133 CH'D DIM'S WAS 2.38 IS 2.39 +03-.00, WAS 1.19 IS 1.20, WAS (3.50) IS 3.50, WAS Ø3.060 IS Ø3.059-3.062 S.F. -131.	2/18/2016	RJC	JAG
4	16-0131	-133 CH'D DIM WAS Ø3.062-3.059 S.F. -131 IS (Ø3.062-3.059) S.F. -131.	8/29/2016	DEW	SM

SEE ATTACHED DEVIATION



SECTION A-A

(-133)

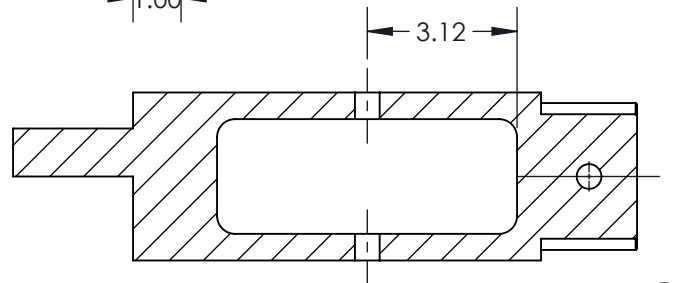
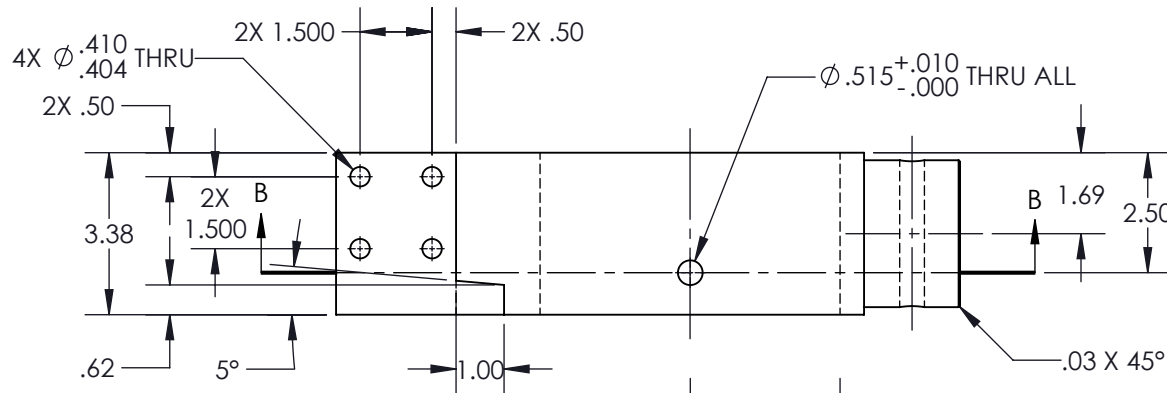
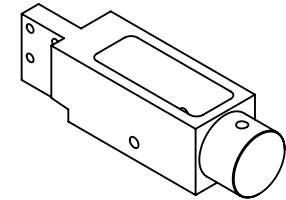
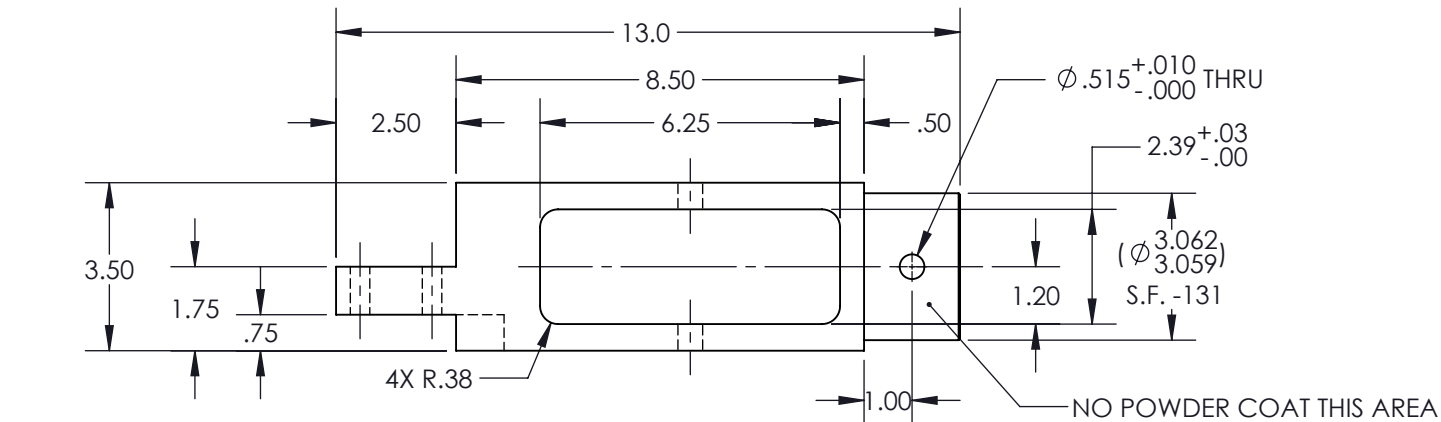
WHEEL BLOCK

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-133	REV 4
MAT'L 6061	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH POWDER COAT YELLOW	.XX ± .03 ANGLES ± 1°
SPEC FED #13538	.X ± .1 SURFACES = 125°
DRAWN BY: CLOUGH	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:4	DATE 2/18/2014
SHEET 14 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
2	15-0026	-134 CH'D DIMS WAS 4X R.25 IS 4X R.38, WAS .50 IS 2X .50, WAS 1.500 IS 2X 1.500, WAS .50 IS 2X .50, WAS 1.500 IS 2X 1.500.	1/30/2015	DPD	JAG
3	16-0041	-134 CH'D DIM'S WAS 2.38 IS 2.39 +03-.00, WAS 1.19 IS 1.20, WAS (3.50) IS 3.50, WAS Ø3.060 IS Ø3.059-3.062 S.F. -131.	2/18/2016	RJC	JAG
4	16-0131	-134 CH'D DIM WAS Ø3.062-3.059 S.F. -131 IS (Ø3.062-3.059) S.F. -131.	8/29/2016	DEW	JAG

SEE ATTACHED DEVIATION



SECTION B-B

-134

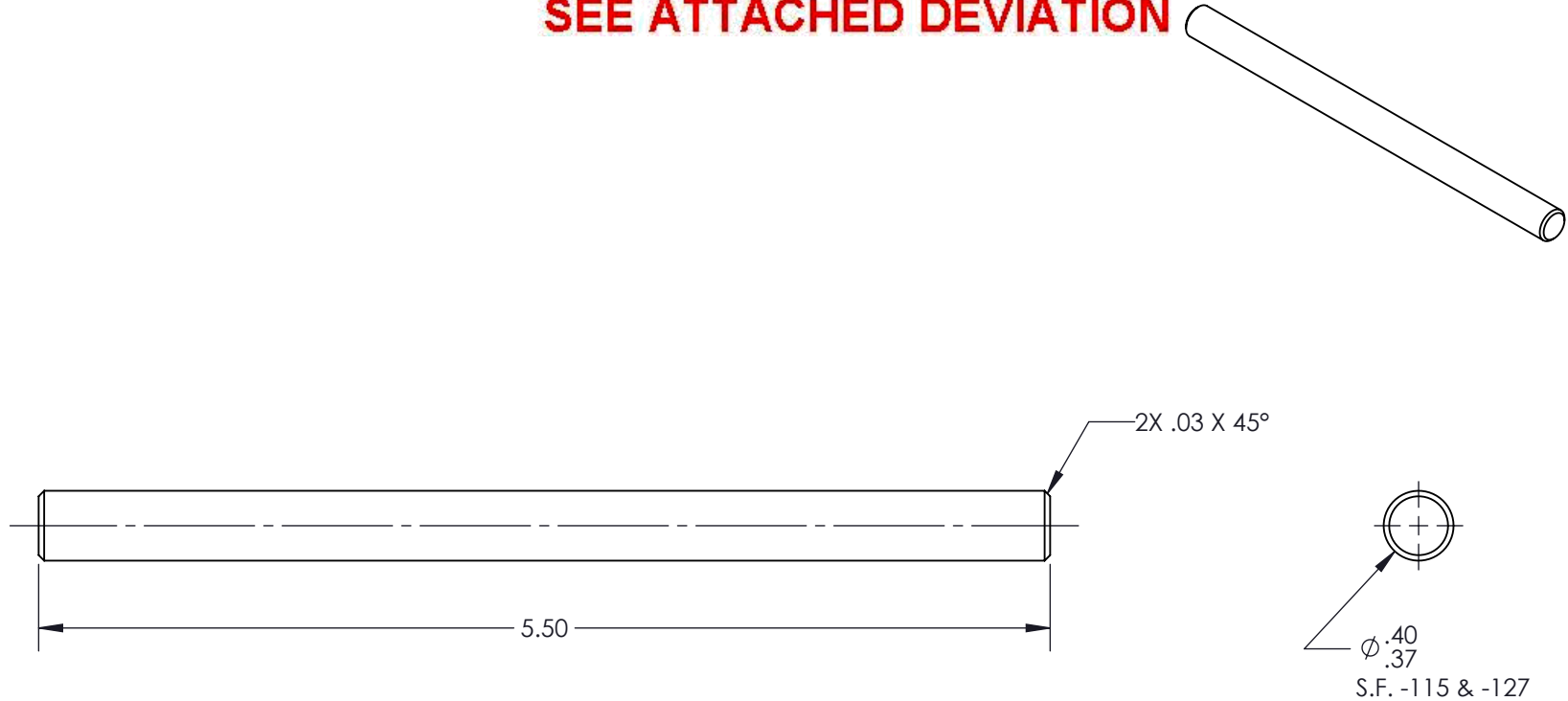
WHEEL BLOCK

DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-134	REV 4
MAT'L 6061	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH POWDER COAT YELLOW	.XX ± .03 ANGLES ± 1°
SPEC FED #13538	.X ± .1 SURFACES = 125/✓
DRAWN BY: CLOUGH	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:4	DATE 2/18/2014
SHEET 15 OF 16	

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REVISIONS					
REV	ECR	DESCRIPTION	DATE	INITIAL	APPROVED
1	14-0194	-135 CH'D DIM WAS Ø.380 IS (Ø.380).	10/20/2014	DPD	JAG
3	16-0041	-135 CH'D DIM WAS (Ø.380) IS Ø.37-.40 S.F. -115 & -127.	2/18/2016	RJC	JAG

SEE ATTACHED DEVIATION



DART AEROSPACE	
TITLE UNIVERSAL HELICOPTER TOW BAR ASSY.	
DWG NO. RB T101808-135	REV 4
MAT'L 303 S.S.	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
HEAT TREAT	.XXX ± .010 FRACTIONS ± 1/8
FINISH	.XX ± .03 ANGLES ± 1°
SPEC	.X ± .1 SURFACES = 125°
DRAWN BY: CLOUGH	1. BREAK ALL SHARP EDGES .015 x 45° OR .015R
CHECKED: DUERFELDT	2. DIMENSIONAL LIMITS APPLY AFTER PLATING
OPPS APPR: ANDERSON	3. INTERPRET DIM AND TOL PER ASME Y14.5M-2009
QA APPR: LINDSAY	USED ON MODEL
APPROVED: GILBERT	BELL
SCALE 1:1	DATE 2/18/2014
SHEET 16 OF 16	

Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE



NCR No.

Route update only

Job: _____ Part No. RB T101808-101 REV. 4		DISPOSITION Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/>		DEPARTMENT/PROCESS <div style="display: flex; justify-content: space-between;"> <div> Skid-tube <input type="checkbox"/> Machining <input type="checkbox"/> Large Fab <input type="checkbox"/> </div> <div> Cross tube <input type="checkbox"/> Small Fab <input type="checkbox"/> Finishing <input type="checkbox"/> </div> <div> Eng. (Non-AW) <input checked="" type="checkbox"/> Prod. Eng. Coord. <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/> </div> <div> Engineering <input type="checkbox"/> Water Jet <input type="checkbox"/> Supplier <input type="checkbox"/> Quality <input type="checkbox"/> </div> </div>					
Date :		Sequence #:		QTY Affected :		MRB (QSI042) JAN 11, 2019			
Description Work Order Deviation RB T101808-101: ADD ITEM -169 IN BOM: QTY: 4X P/N: McMaster#90935A131 OR EQUIV. DESCRIPTION: STEEL BLACK-OXIDE PAN HEAD SELF-TAPPING SCREW #4-40 X 0.38"LG. ADD NOTE 3: INSTALL DART PLACARD USING ITEM -169 WHERE SHOWN BALLOONS -139 & -161 QTY WAS 4X BALLOONS -139 & -161 QTY IS 2X PER MBB				Disposition THIS DEVIATION IS ACCEPTABLE THE FIT, FORM, AND FUNCTION OF THE PART WILL BE AS ORIGINALLY INTENDED				Completed By <hr/> Lead hand / Supervisor <hr/> QC / QA Coordinator	
Root Cause Operator <input type="checkbox"/> Manufacturing Process <input type="checkbox"/> Equip/Tooling <input checked="" type="checkbox"/> Handling/Presservation <input type="checkbox"/> Material <input type="checkbox"/> Product Improvement <input checked="" type="checkbox"/> Process Improvement <input type="checkbox"/> Human Factors <input type="checkbox"/>		FAULT CATEGORY <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Bending <input type="checkbox"/> Crushing <input type="checkbox"/> Cracks <input type="checkbox"/> Crimp/Kink/Ripple/Wave/Twist <input type="checkbox"/> Marks/Chatter <input type="checkbox"/> Mislabeled </div> <div> <input type="checkbox"/> Contamination <input type="checkbox"/> Misaligned/off center <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damage/Defect <input type="checkbox"/> Incomplete/Unclear Instructions <input type="checkbox"/> Drill Holes <input type="checkbox"/> Fit/Function </div> <div> <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Folio/Program <input type="checkbox"/> Grain Direction <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Off-set/Set-up </div> <div> <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Outside Tolerance <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Misread </div> </div>							
		Other/Details:							